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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/529,257	04/11/2000	MASAKAZU ONIZUKA	1684/48707	5277

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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/529,257

Applicant(s)

ONIZUKA ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 23, 2003 has been entered.

Response to Amendment

2. Applicant's amendment filed on September 23, 2003 has been received and carefully considered. The changes made to the Specification are acceptable. Claims 2, 3 and 5-7 have been cancelled. Claims 1 and 4 remain active.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tamaru et al. (JP 08-000950) in view of Johnson (US 2,931,580).

With respect to claim 1, Tamaru et al. disclose a wet gas desulfurizing apparatus for absorbing the sulfur oxides of an exhaust gas with an absorption liquid ([Sections 0002-0003]), said apparatus comprising a branch pipe **12** of diameter **D** ([Section 0016], FIG. 3) for circulating an absorption liquid, said pipe **12** extending into a collection tank **4** and having an end which discharges absorption liquid into the collection tank (FIG. 1). Furthermore, Tamaru et al. disclose an air-blowing pipe **14** for injecting air into the pipe **12**, said air-blowing pipe having

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an end inserted into the pipe **12** at an insertion point (mixing point **13**). Tamaru et al. also disclose the branch pipe **12** extends through a wall of the collection tank **4** (see FIG. 1) in order to discharge the circulating absorption liquid into the absorption liquid in the collection tank **4**.

Tamaru et al. are silent as to the air-blowing pipe **14** being inserted into the branch pipe at an insertion point located between 3D and 10D from the discharge end of the pipe **12**. However, Tamaru et al. disclose that generating a “foam” by mixing the absorption liquid and air prior to injection improves the diffusion of air in the collection tank and, “it becomes possible to make it blow in into a liquid as a detailed foam also of a mass of gas,” interpreted to mean that the foam is still present in the liquid upon reaching the discharge end of pipe **12** (machine translation; [Section 0008]). Therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made to insert the air-blowing pipe into the branch pipe at an insertion point between 3D and 10D from the discharge end of a branch pipe in the apparatus of Tamaru et al., on the basis of suitability for the intended use and absent showing unexpected results thereof, because inserting the air-blowing pipe at a point of sufficient distance upstream of the discharge end allows the air and fluid to be well mixed in the discharge pipe prior to injection, and when compared with the case of gas injection without prior mixing, the generated “foam” mixture more easily diffuses into the collection tank, allowing better distribution of the gas in the liquid, as taught by Tamaru et al. Furthermore, shifting location of parts is obvious, and where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

In view of the newly added limitations, Tamaru et al. is silent as to the instantly recited structure of the insertion point **13**, requiring the air-blowing pipe **14** to be inserted into the

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branch pipe **12** so that a central axis of the air blowing pipe **14** meets with a central axis of the branch pipe **12** at an angle, and requiring an end of the air blowing pipe **14** which opens in the branch pipe **12** to be configured as a semicircular trough facing downstream towards the collection tank **4**. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select the recited structure for the insertion point in the apparatus of Tamaru et al., on the basis of suitability for the intended use, because such mixing means is conventionally known in the art, as evidenced by Johnson (below), and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). In particular, Johnson (FIG. 3, 5; column 2, line 52 to column 3, line 13) teaches a fluid mixing means comprising a first pipe (mixing chamber **26**) for carrying a first fluid (i.e., pressurized air) introduced via nipple **27** and a second pipe (outlet portion **36**) for carrying a second fluid (i.e., liquid cleaning solution) introduced via tube **31**, the second pipe **36** being inserted into the first pipe **26** so that a central axis of the second pipe **36** meets with a central axis of the first pipe **26** at an angle, and wherein the an end of the second pipe **36** (i.e., the discharge opening **38**) substantially defines a "semicircular trough" (see FIG. 3) that faces downstream (i.e., flow direction indicated by the letter **D**). Pipes **26** and **36** cooperatively form a venturi tube wherein, "air which is highly turbulent, breaks the cleaning solution into extremely small particles and the cleaning solution is effectively misted," and wherein, "the high velocity air also breaks the water into small particles which subsequently move turbulently through the nozzle pipe **39** and through the spray tip **40** thereof," (column 3, lines 39-67), essentially functioning like the mixing section **13** of Tamaru et al. Although

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Johnson uses the mixing means to introduce air via the first pipe 26/27 and cleaning solution via the second pipe 36, such that the cleaning solution is lightly misted, reversing the fluid flows such that liquid were introduced via the first pipe 26/27 and gas were introduced via the second pipe 36 would have involved ordinary skill in the art, depending on the intended use of the apparatus (i.e., depending on the desired fluid to be metered via the valved pipe 36, or the desired "carrier fluid" to be introduced via pipe 26/27).

With respect to claim 4, Tamaru et al. disclose that the interior diameter d of the air-blowing pipe 14 may be changed with changes in the flow rate through pipe 12, and further disclose a specific diameter d in the range of $0.3D$ to $0.7D$ (substantially the recited range of $0.4D$ to $0.7D$), where D is the diameter of pipe 12. Numerical ranges that overlap prior art ranges were held to have been obvious. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960).

Response to Arguments

4. Applicant's arguments with respect to claims 1 and 4 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for

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the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung

January 12, 2004

JAL

Hien Tran

**HIEN TRAN
PRIMARY EXAMINER**